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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
XU, KEVIN K	

ART UNIT	PAPER NUMBER
2676	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/500,896	ROTH ET AL.	
	Examiner	Art Unit	
	Kevin K. Xu	2676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 1, 3, 10, 13 are objected to because of the following informalities: These claims include the words “printing” and “printed” even though the claims are directed to a display. This renders the claims to be somewhat inconsistent in terminology. Clarification is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1,4, 6-11, 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Karakawa (6,304,237).

Karakawa teaches a display for reproducing an image intended for printing on a substrate using a set of inks, the image having a perceived color gamut when printed on a said substrate, the display comprising a light source generating a set of at least

three primary colors by explaining the invention comprises a monochromatic red (R), green (G), blue (B) pulsed laser light source adapted for display applications, and particularly, LCD display systems. (Col 1, 59-61)

Karakawa further teaches a display for reproducing an image intended for printing on a substrate using a set of inks, the image having a perceived color gamut when printed on a said substrate, the display comprising a controller combining the set of at least three primary colors to substantially reproduce said image by showing the schematic diagram of the monochromatic R, G, B laser light source coupled with three transmissive LCD panels as the spatial light modulators is shown in FIG. 3. Since LCD panels are totally insensitive to the pulse width modulation, this monochromatic R,G,B laser light source can be coupled with both transmissive and reflective LCD panels acting as spatial light modulators. (Col 5 lines 32-38) Since the utilization of a spatial light modulator is well known in the art as an example of a controller to determine the relative location of light of each color as projected onto the view screen, Karakawa teaches the operation of a controller as a means of projecting the projection lens contents onto the viewing screen (Fig 3).

Karakawa additionally teaches a display for reproducing an image intended for printing on a substrate using a set of inks, the image having a perceived color gamut when printed on a said substrate, the display comprising wherein said at least three primary colors define a viewed color gamut which substantially covers said perceived color gamut by explaining a monochromatic red (R), green (G), and blue (B) light source having well color balanced white light output is very desirable light source for

many display applications (Col 1, lines 11-13) and the invention presents a monochromatic R, G, B light source which incorporates digital color space conversion electronics which transfer input video signal color space into R, G, B color space created by the monochromatic R, G, B light source, so that the resulting color spectrum is acceptable for display use. (Col 2, lines 38-42) Therefore claim 1 is anticipated by Karakawa.

Karakawa moreover teaches the display claimed in claim 4, wherein the light source of the display includes at least a plurality of LEDs by showing the monochromatic R, G, B laser light source incorporates cw **diode laser bar** (Col 3, lines 16-17) and referring to Fig. 1, the master oscillator is coupled through output coupler to multiple Nd:YVO.sub.4 based gain modules (e.g., power amplifiers), and the average output power increases as more gain modules are added to the master oscillator. Each gain module is constructed from Nd:YVO.sub.4 crystal slab transversely pumped by one or two cw **diode laser bars**. (Col 3, lines 43-49) Therefore claim 4 is anticipated by Karakawa.

Karakawa in addition teaches the display claimed in claim 6, wherein the light produces at least four colors by explaining the performance goals of the monochromatic R,G,B laser light source are usually defined by the requirement for pulse repetition rate and FWHM (full-width half-max) pulse width, as well as producing high luminosity, well color-balanced white light when R,G,B laser light are mixed together. (Col 3, lines 11-15) Since the definition of white light is well known in the art as containing all the colors of the visible spectrum, the display taught by Karakawa

utilizes light producing at least four colors. Therefore claim 6 is anticipated by Karakawa.

Karakawa further teaches the display claimed in claim 7, wherein the light source produces three primary colors, the transmission spectra of which define said viewed color gamut by showing the invention presents a monochromatic R, G, B light source which incorporates digital color space conversion electronics which transfer input video signal color space into R, G, B color space created by the monochromatic R, G, B light source, so that the resulting color spectrum is acceptable for display use. (Col 2, lines 38-42). Therefore claim 7 is anticipated by Karakawa.

Karakawa further teaches the displayed claimed in claim 8, comprising a spatial light modulator by demonstrating the invention includes display systems employing the monochromatic, pulsed laser light source, particularly for LCD display systems, since LCD panel (one of spatial light modulators) does not require pulse width modulation, the R, G, B pulsed laser light source may be coupled to three LCD panels (one panel for each primary color) to create a display system. (Col 2, lines 26-32) Therefore claim 8 is anticipated by Karakawa.

Karakawa moreover teaches the display claimed in claim 9, comprising a digital micro-mirror device by showing although the specific example of three transmissive LCD panels with the monochromatic R,G, B laser light source has been discussed in detail, the invention can be coupled with other different types of spatial light modulators; such as, but not limited to: digital mirror device (DMD), two dimensional electro- mechanical, digital, mirror array device modulators, as manufactured by Texas

Instruments; (Col 6, lines 43-47 and Col 6 lines 54-56). Therefore claim 9 is anticipated by Karakawa.

Karakawa in addition teaches a method for reproducing an image intended for printing on a substrate using a set of inks, the image having a perceived color gamut when printed on a said substrate, the method comprising accepting data corresponding to said image by showing the invention presents a monochromatic R, G, B light source which incorporates digital color space conversion electronics which transfer input video signal color space into R, G, B color space created by the monochromatic R, G, B light source, so that the resulting color spectrum is acceptable for display use. (Col 2, lines 38-42).

Karakawa further teaches a method for reproducing an image intended for printing on a substrate using a set of inks, the image having a perceived color gamut when printed on a said substrate, the method comprising converting said data to data corresponding to a set of at least three primary colors by explaining the invention presents a monochromatic R, G, B light source which incorporates digital color space conversion electronics which transfer input video signal color space into R, G, B color space created by the monochromatic R, G, B light source, so that the resulting color spectrum is acceptable for display use. (Col 2, lines 38-42).

Karakawa additionally teaches a method for reproducing an image intended for printing on a substrate using a set of inks, the image having a perceived color gamut when printed on a said substrate, the method comprising selectively producing light of said at least three primary colors by showing the invention comprises a monochromatic

red (R), green (G), blue (B) pulsed laser light source adapted for display applications, and particularly, LCD display systems. (Col 1, 59-61)

Karakawa additionally teaches a method for reproducing an image intended for printing on a substrate using a set of inks, the image having a perceived color gamut when printed on a said substrate, the method comprising combining at least three primary colors to substantially reproduce said image by showing the schematic diagram of the monochromatic R, G, B laser light source coupled with three transmissive LCD panels as the spatial light modulators is shown in FIG. 3. Since LCD panels are totally insensitive to the pulse width modulation, this monochromatic R,G,B laser light source can be coupled with both transmissive and reflective LCD panels acting as spatial light modulators. (Col 5 lines 32-38) Since the utilization of a spatial light modulator is well known in the art as an example of a controller to determine the relative location of light of each color as projected onto the view screen, Karakawa teaches the operation of a controller as a means of projecting the projection lens contents onto the viewing screen (Fig 3).

Karakawa moreover teaches a method for reproducing an image intended for printing on a substrate using a set of inks, the image having a perceived color gamut when printed on a said substrate, the method comprising wherein said at least three primary colors define a viewed color gamut which substantially covers said perceived color gamut by explaining a monochromatic red (R), green (G), and blue (B) light source having well color balanced white light output is very desirable light source for many display applications (Col 1, lines 11-13) and the invention presents a

monochromatic R, G, B light source which incorporates digital color space conversion electronics which transfer input video signal color space into R, G, B color space created by the monochromatic R, G, B light source, so that the resulting color spectrum is acceptable for display use. (Col 2, lines 38-42) Therefore claim 10 is anticipated by Karakawa.

Karakawa further teaches the method claimed in claim 11 wherein converting said data comprises converting the data using a conversion matrix by showing The schematic diagram of digital color space converter design discussed below is shown in FIG. 5. In order to duplicate the input signal color space, this monochromatic R,G,B laser light source incorporates the digital electronic circuit design that performs the following: b. 24 bits of color information are input through C.sub.R, C.sub.B and Y inputs, **converted** to a new color space (e.g., monochromatic R,G,B laser light source color space) by the 3.times.3 **matrix multiplier** in real time basis, and output onto three separate input controls to the spatial light modulator used. (Col 6, lines 12-15 and Col 6, lines 19-24) Therefore claim 11 is anticipated by Karakawa.

Karakawa in addition teaches the method claimed in claim 15 wherein said at least three primary colors include a red primary, a green primary and a blue primary, the transmission spectra of which define said viewed color gamut by showing the invention presents a monochromatic R, G, B light source which incorporates digital color space conversion electronics which transfer input video signal color space into R, G, B color space created by the monochromatic R, G, B light source, so that the

resulting color spectrum is acceptable for display use. (Col 2, lines 38-42) Therefore claim 15 is anticipated by Karakawa.

Karakawa in addition teaches the method claimed in claim 16 comprising spatially modulating the light of said at least three primary colors by explaining the invention includes display systems employing the monochromatic, pulsed laser light source, particularly for LCD display systems, since LCD panel (one of spatial light modulators) does not require pulse width modulation, the R, G, B pulsed laser light source may be coupled to three LCD panels (one panel for each primary color) to create a display system. (Col 2, lines 26-32). Therefore claim 16 is anticipated by Karakawa.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-3, 5, 12-13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karakawa (6,304,237) in view of Ben-David et al (6,870,532 hereinafter Ben-David).

The teachings of Karakawa are given in the previous paragraphs of this Office Action. However, in regard to claims 2 and 12, Karakawa fails to explicitly teach or suggest a display comprising of a correction filter, the spectrum of the correction filter

being based on the spectrum reflected from a type of said substrate. However, this is what Ben-David teaches. Referring to Fig. 5, Ben-David teaches a system 48 is based on passing white light from a source 50 through appropriate color filters 52 to form colored light of a defined spectral range. (Col 7, lines 56-58 and Fig. 5) Furthermore, Ben-David teaches as shown with regard to FIG. 7, another optional embodiment of the system of the present invention is preferably based upon a simultaneous projection scheme. In a system 102, a white light source 104 produces a white light beam. The light beam is passed through a collimating lens 106 for collecting and focusing the light. Next, the light is passed through a plurality of dichroic mirrors 108. Preferably, one dichroic mirror 108 is used for each desired primary color. Four such dichroic mirrors 108 are shown for the purposes of description only and without any intention of being limiting. Each dichroic mirror 108 passes part of the light spectrum and reflects the remaining part of the light spectrum, thereby acting as a filter to produce light of each desired primary color. (Col 13, line 63 – Col 14, line 9). Although Karakawa does not explicitly teach a display comprising a correction filter, the spectrum of the correction filter being based on the spectrum reflected from a type of said substrate, it would have been obvious to one of ordinary skill in the art at the time the present invention was made to combine the teachings of a system based on passing white light from a source through appropriate color filters taught by Ben-David into a monochromatic R, G, B light source display system and method as taught by Karakawa because the use of appropriate color filters as taught by Ben-David provides the form needed in colored light of a defined spectral range (Col 7, lines 56-57) and provides transmission spectra

of which is designed to give a coverage of a major portion of the gamut of the eye. (Col 8, lines 51-53) and thus, a more accurate display for reproducing an image would be realized.

In regard to claims 3 and 13, Karakawa fails to explicitly teach or suggest a display comprising of a correction filter, the spectrum of the correction filter being based on the spectrum of an intended light used to view the image when printed. However, this is what Ben-David teaches. Referring to Figs 5A and 5B, Ben-David teaches the transmission spectra of RGB filters, shown as spectra 84 (red), 86 (green) and 88 (blue), which are clearly highly limited and cannot provide wide coverage for the gamut of colors which are displayed. FIG. 5B shows the transmission spectra of the six-color system, shown as spectra 90, 92, 94, 96, 98, and 100. These spectra are obtained by halving the spectral range of each of the RGB filters with spectra as shown in FIG. 5A. The pair of filters 90 and 92 covers the same spectral range of the wider filter 84, and so forth, thereby increasing the possible gamut of colors, which can be covered. The selection of the number of primary colors is preferably performed according to a balance between the desirability of adding more primary colors, which increases the possible gamut of displayable colors, and the increased complexity of adding more colors. (Col 12, lines 45-60) Although Karakawa does not explicitly teach a display comprising a correction filter, the spectrum of the correction filter being based on the spectrum of an intended light, it would have been obvious to one of ordinary skill in the art at the time the present invention was made to combine the teachings of an R, G, B filter with spectra taught by Ben-David into a monochromatic R, G, B light source

display system and method as taught by Karakawa because the use of the pair of filters 90 and 92 (Fig 5B), as taught by Ben-David, cover the same spectral range of the wider filter 84, and thus, increasing the possible gamut of colors which can be covered and displayed. (Col 12, lines 53-55) and therefore, a more accurate display for reproducing an image would be realized.

In regard to claims 5 and 14, Karakawa fails to explicitly teach or suggest a display wherein the light source includes at least a color wheel. However, this is what Ben-David teaches. Referring to Fig 3B, Ben-David teaches system 48 features six such colored filters 52, which as shown may optionally be configured in a color filter wheel

54. In this example, the combination of light source 50 and color filters 52 can be considered to form at least part of the light source of FIG. 3A above, optionally with other components involved in the production of the light itself. (Col 7, lines 59-65) Furthermore, referring to Fig. 4A, Ben-David teaches an illustrative implementation for the filter arrangement of the color wheel with such a Neutral Density (ND) filter 82. The color filter wheel is divided into several color sections, labeled as "C1" to "C7" respectively, the width of each is 2.pi./N radians, where N is the number of primary colors. Each color section is a different color filter, which preferably has a separate ND filter. The ND filter does not affect the spectral content of the filtered light, but rather alters the intensity of the filtered light over the entire spectrum. (Col 11, lines 30-40) Although Karakawa does not explicitly teach a display wherein the light source includes at least a color wheel, it would have been obvious to one of ordinary skill in

the art at the time the present invention was made to combine the teachings of a color wheel to form part of the light source into a monochromatic R, G, B light source display system and method as taught by Karakawa because the utilization of a color wheel taught by Ben-David holds transmission spectra of which is designed to give a coverage of a major portion of the gamut of the eye (Col 8, lines 51-53) and the implementation a color wheel with a neutral density filter, as taught by Ben-David, will assist in altering the intensity of the filtered light over the entire spectrum (Col 11, lines 38-39) and thus, a more accurate display for reproducing an image would be realized.

Conclusion

Any inquiry concerning this communication or earlier communications from examiner should be directed to Kevin K Xu whose telephone number is 571-272-7747. The examiner can normally be reached on Monday-Friday from 8:30 AM – 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on (571) 272-7778.

Information regarding the status of an application may be obtained from Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EB) at 866-217-9197 (toll-free).

K. X.

Kevin Xu

9/29/05

9/30/05

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